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IN VIVO EFFECTS OF OXYGEN AT VARYING PRESSURES ON ERYTHROCYTES --ETC(U)

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N00014-67-A-0287-0003

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NR 281-049
Coh 441

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS
BEFORE COMPLETING FORM

1. REPORT NUMBER Final	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) In Vivo Effects of Oxygen at Varying Pressures on Erythrocytes and Brain.		5. TYPE OF REPORT & PERIOD COVERED 1965- Summary Report 1976
6. AUTHOR(s) Charles E. Mengel M.D.		7. CONTRACT OR GRANT NUMBER(s) N00014-67-A-0287-0003
8. PERFORMING ORGANIZATION NAME AND ADDRESS University of Missouri Columbia, Missouri 65201		9. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 129P.
10. CONTROLLING OFFICE NAME AND ADDRESS Procuring Contracting Officer Office of Naval Research 300 N. Quincy Department of the Navy Arlington, Va.		11. REPORT DATE 6/17/77
12. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Office of Naval Research Resident Rep. Park Hill Plaza 2326 Louisiana Street Lawrence, Kansas 66044		13. NUMBER OF PAGES 8
14. DISTRIBUTION STATEMENT (of this Report) Biological and Medical Sciences Hyperbaric Physiology		15. SECURITY CLASS. (of this report)
15. DISTRIBUTION STATEMENT A Approved for public release; Distribution Unlimited		
16. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) Final summary rept. 1965-1976, N.A.		
17. SUPPLEMENTARY NOTES None		
18. KEY WORDS (Continue on reverse side if necessary and identify by block number) Hyperoxia, hyperbaric oxygen, red cells, brain		
19. ABSTRACT (Continue on reverse side if necessary and identify by block number) See attached		

ADA 041760

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SUMMARY REPORT

CONTRACT N00014-67-A-0287-0003

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1965-1976

In Vivo Effects of Oxygen at Varying
Pressures on Erythrocytes and Brain

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The following is a list of the major scientific accomplishments achieved under support of this contract. Details of all of them are to be found in the publications derived from these studies.

1. First evidence of hemolysis in a human after exposure to oxygen under high pressure (OHP).
2. Evidence for a relationship between in vivo tocopherol status and central nervous system toxicity (seizures) during exposure to OHP.
3. Demonstration of in vivo inhibition of RBC cholinesterase by OHP and definition that it was due to peroxides.
4. First proof of in vivo peroxidation of lipid in RBCs (produced by hyperoxia).
5. Description of changes in RBC glycolytic intermediates due to OHP and associated enzyme changes.
6. Determination of the exact biochemical and functional events leading to in vivo destruction of RBCs by hyperoxia.
7. First evidence for in vivo consumption of tocopherol during exposure to hyperoxia.
8. Demonstration of in vivo changes in fatty acid composition of RBCs induced by hyperoxia and their relation to RBC destruction.
9. Evidence that hyperoxia of any degree could produce hemolysis if prolonged enough.
10. Demonstration of changes in WBCs produced by hyperoxia.
11. Effects of drugs on susceptibility of tissues (RBCs and brain) to hyperoxia.
12. Role of circadian rhythm in susceptibility to hyperoxic seizures.

13. Proof of in vivo production of H_2O_2 in RBCs and brain during exposure to hyperoxia.
14. Proof that senescent RBCs were those most susceptible to in vivo hyperoxia.
15. Study of factors that influence oxygen transport of RBCs.
16. Effect of drugs on red cells in humans that might influence susceptibility to hyperoxia.

PUBLICATIONS OF STUDIES DIRECTLY RELATED
TO THIS RESEARCH PROJECT

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